

23. The method of claim 22, further comprising transmitting the IP packets or MAC frames from the router to an external network.

24. The method of claim 21, further comprising transmitting the IP packets or MAC frames to a LAN hub.

25. The method of claim 21, further comprising converting the digital and analog voice data into TCP/IP packets or UDP/IP packets with the CPU.

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concl.

REMARKS

Claims 1-25 are now pending in this application. New claims 10-25 have been added by this amendment. Each of the pending claims is believed to define an invention which is novel and unobvious over the cited references. Favorable reconsideration of this case is respectfully requested.

Copies of Figure 2 and 3 are submitted herewith with corrections indicated in red ink. Typographical errors have been corrected. Corrected formal drawings for Figures 2 and 3 are concurrently submitted reflecting the corrections.

Claim 1 has been amended to correct the informality noted by the Examiner.

Claims 1-9 have been rejected under 35 U.S.C. 112, second paragraph as being indefinite. Claim 1 has been amended to eliminate the unclear terms noted by the Examiner.

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As per claims 6-9, these claims were rejected as being indefinite because, according to the Examiner, they set forth a method step but are dependent from an apparatus claim. First, it should be noted that there is no requirement that a claim, whether independent or dependent, be restricted to one of the classes of patentable subject matter defined in 35 U.S.C. 101. For example, under 35 U.S.C. 101, a claim can recite a method, an apparatus, or a method and an apparatus. Hence, using statutory construction, claims 6-9 cannot be rejected under 35 U.S.C. 112, second paragraph. In any event, to further prosecution claim 6 has been amended into independent form. Also, claim 8 recites the steps of "routing" and "switching".

In view of the above, it is respectfully submitted that all pending claims are in all aspects in compliance with 35 U.S.C. 112, second paragraph. Therefore, the withdrawal of this rejection is respectfully requested.

The present invention relates to a telecommunication apparatus for voice telephones installed in a LAN. As recited in independent claim 1, for example, a LAN comprises a LAN switch switching unit for switching and connecting a plurality of interfaces. A plurality of LAN hubs accommodate equipment connected to the LAN switching unit via the interfaces and performing data communication over the LAN. The concentrator comprises a LAN interface connected to the LAN switching unit. At least one set of voice telephone interfaces is connected to at least one voice telephone. Voice data transmitted and received by the at least one set of voice telephone interfaces is

converted into MAC frames and the voice data converted into the MAC frames is relayed to the LAN interface.

Claims 1-3 have been rejected under 35 U.S.C. 103(a) as being unpatentable of U.S. Patent No. 5,859,848 to Miura in view of U.S. Patent No. 6,215,790 to Voit et al.

Miura et al. describes an asynchronous transfer mode packet conversion to different formats. In particular, Miura et al. describes an ATM – LAN network and how to accommodate the terminals which communicate by a LAN frame on an ATM network. It is asserted in the Office Action that element 901 of Miura discloses a concentrator as recited in the present claims. However, Miura discloses an ATM terminal adapter 901, which converts a LAN frame to an ATM frame and is used to accommodate the LAN frame terminals on an ATM network. In particular, column 8, lines 28-41 of Miura describe an ATM terminal adapter. The ATM terminal adapter 901 connects to conventional LANs, converts LAN packets into ATM packets, transmits information to a destination communication terminal, and converts received ATM packets into LAN packets. Accordingly, ATM terminal adapter 901 disclosed in Miura does not correspond to the concentrator recited in independent claims 1 and 10. Independent claims 1 and 10 recite that the concentrator is adapted to receive voice data from voice interfaces and converts the voice data into MAC frames and to relay the converted voice data to a LAN interface. There is no teaching or suggestion in Miura of this feature.

Voit et al. do not supplement Miura et al. to teach or suggest the concentrator as recited in the rejected claims. Voit et al. describes an automatic called party locator over

the Internet with provisioning. The system and method of Voit connect a voice call on the Internet automatically. Voit et al. describes that a PC processes a voice and that voice communication on the Internet is possible by adding a microphone and speaker to a PC, column 12, lines 12-14. However, there is no teaching or suggestion in Voit et al. of a concentrator converting voice data into MAC frames as recited in the rejected claims. The concentrator makes it possible for a telephone terminal that is accommodated on a telephone subscriber line to communicate on a LAN.

With regard to claim 3, the cited references fail to teach or suggest structure to connect a telephone terminal directly to the IP network. The concentrator cited in claim 3 accommodates a telephone terminal on a LAN and works as a gateway at the point of contact with a WAN.

In view of the above, it is clear that the cited references do not teach or suggest the present invention. Therefore, the withdrawal of the rejection of claims 1-3 is respectfully requested.

New claims 12-25 are directed to the third and fourth embodiments of the invention described in the present specification at page 19, line 6 – page 20, line 10 and page 20, line 12 – page 21, line 3, respectively. In particular, reading claim 12 on the embodiment of the invention illustrated in Figure 6, a telecommunication apparatus 30A includes at least one LAN interface 30a, 30b coupled to LAN equipment, a CPU 36, and at least one voice telephone 5, 6. A set of voice telephone interfaces 60 are adapted to receive and transmit digital or analog voice data or call control data between the CPU 36

and the at least one voice telephone 5, 6. The CPU 36 is adapted to convert the digital or analog voice data or call control data into IP packets or MAC frames and to transmit the IP packets or MAC frames to the at least one LAN interface 30a, 30b. Accordingly, independent claim 12 recites that voice data is converted into MAC frames and relayed to a LAN interface. As discussed above, there is no discussion in Miura or Voit et al. of this feature. New independent claims 18 and 21 include similar recitations. Accordingly, new claims 12-25 are patentable over the cited references.

Claims 4-9 were not rejected over the prior art and were indicated in the Office Action as being allowable if rewritten in independent form. Claim 6 has been rewritten in independent form and is now believed to be in allowable form. Claim 7 depends from claim 6. Claims 4, 5 and 9 depend directly or indirectly on independent claim 1 and would be allowable for at least the reasons discussed above regarding independent claim 1.

Accordingly, allowance of all pending claims and early issuance of a Notice of Allowance is respectfully solicited.

If the Examiner is of the opinion that the prosecution of this application would be advanced by a personal interview, the Examiner is invited to telephone undersigned counsel to arrange for such an interview.


Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

Amendment
U.S. Application No. 09/254,864

The Commissioner is authorized to charge any fee necessitated by this
Amendment to our Deposit Account No. 22-0261.

Respectfully submitted,

Date: 12/18/08


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VERSION SHOWING CHANGES MADE

IN THE DISCLOSURE:

Please replace first paragraph beginning on page 1, with the following rewritten paragraph:

The invention relates to a concentrator for voice telephones, accommodating the voice telephones, and the equivalent in Local Area Network (LAN) interfaces, and a method of communication over a LAN using the concentrators.

Please replace second paragraph beginning on page 1, with the following rewritten paragraph:

In a conventional method of internal communication within a business compound, voice communications have been provided by a PBX (private branch exchange) accommodating voice telephones, and data communications have been provided by a LAN, independently from each other. Along with a decline in prices of personal computers (referred to as PCs hereinafter) and higher performance thereof, the PCs have become popularized as much as ordinary voice telephones, particularly, in recent times. Consequently, an environment wherein voice telephones are integrated into a LAN has come to be desired for internal communication within a business compound.

Please replace fourth paragraph beginning on page 1, and continuing on page 2 with the following rewritten paragraph:



In spite of an attempt to integrate an infrastructure for internal communications within a business compound by incorporating voice telephones into a LAN, it has been difficult to implement such integration because of the peculiarity of 'voice', such as periodicity, and the need for real time response contradicts characteristics of data communications, such as burst and high reliability. As a result, facilities for both a PBX and a LAN have been required, accompanied by installation of two wiring systems.

Page 2, between the first and second paragraphs, please replace the heading with the following rewritten heading:

~~DISCLOSURE~~ SUMMARY OF THE INVENTION

Please replace the fourth paragraph beginning on page 3, with the following rewritten paragraph:

A method of communication according to a sixth aspect of the invention is carried out over a LAN comprising a plurality of LAN hubs accommodating equipment for performing data communication, a plurality of the aforesaid TLAs ~~as disclosed in Claim 1~~, and the LAN switching unit having a plurality of ports and for switching and connecting between the plurality of the LAN hubs and the plurality of the TLAs as follows.

Please replace the fifth paragraph beginning on page 4, with the following rewritten paragraph:

A method of communication according to a ninth aspect of the invention is carried out over a LAN comprising the plurality of LAN hubs accommodating equipment for performing data communication, the plurality of the TLAs ~~as disclosed in Claim 1,~~ and the LAN switching unit having the plurality of ports and for switching and connecting between the plurality of the LAN hubs and the plurality of the TLAs as follows.

Please replace the third paragraph beginning on page 5, with the following rewritten paragraph:

With the TLA according to the third aspect of the invention, ~~wherein~~ signals from circuits of analog telephone network subscribers sent out by a general telephone are converted into call control protocols according to TCP-IP. That is, call control can be performed on the side of the telephone and TLA without the need of call control by the PC or work station.

Please replace the second paragraph beginning on page 10, with the following rewritten paragraph:

In this embodiment of the invention, the MAC (Media Access Control) frame is used for a frame format. As shown in Fig. 3, the MAC frame consists of a preamble (PA)

SFD (Start Frame Delimeter), hardware DA (Destination Address), hardware SA (Service Address), ETYPE, Data Block, and Frame Check Sequences (FCS). In the case of the voice switching system shown in Fig. 1, voice data are packetized, and a packetized voice frame is assembled by substituting the data block of the MAC frame with the ATM (Asynchronous Transfer Mode) · AAL type 1 (JT 1.363) frame. The ATM · AAL type 1 frame is composed of a ATM header, a SAPDU – H field having a function of fluctuation absorption, and a voice data field. Now referring to Fig. 3, functions of respective parts of the TLA 30 are described.

Please replace the third paragraph beginning on page 11, and continuing on page 12 with the following rewritten paragraph:

Fig. 4 is a chart showing operation sequence of the TLA, used for the voice switching system over the LAN, shown in Fig. 1, indicating directions of transmission and processing periods. The directions of transmission are denoted by the interface numbers shown in Fig. 1. Now referring to Fig. 4, operation of system is described hereinafter when call request, call or voice communication, and disconnection are performed between the voice telephone 5 ~~juxtaposed~~ associated with the PC 1 and the voice telephone 8 ~~juxtaposed~~ associated with the PC 4. Meanwhile, the LAN – HUB interface 30b, 40b and the LAN – SQ interfaces 30a, 40a of the TLAs 30 and 40, respectively, are assigned respective MAC addresses, and the voice telephones incorporated in the TLAs 30 and 40, respectively, are to be identified by VPI/VCI

numbers in the ATM header shown in Fig. 3, or voice telephone numbers used in CTL bit shown in the figure. The PCs 1 to 4 or work stations and the NS unit 51 are also assigned respective MAC addresses requiring no particular conditions. Further, in the system according to this embodiment of the invention, for communication over interfaces other than the interfaces 5a, 30a, 40a, and 8a, a communication protocol, for example, TCP/IP is used.

Please replace the fifth paragraph beginning on page 14, and continuing on page 15 with the following rewritten paragraph:

The HWIF circuit 34 makes a selection on whether ~~an~~a descending voice channel is relayed to the AAL 1 circuit 33 or data for a silent pattern, howler, and ringer tone data are transmitted to the channel, according to a command from the PCU 36. The AAL 1 circuit 44 converts voice data transmitted from the interface package unit 30B via the HWIF circuit 34 into the ATM · AAL 1 frame (JT – I. 363) such that differences in arrival time of packetized voices over an asynchronous network, that is, fluctuation, can be absorbed. A range of packetization in the AAL 1 circuit 33 is as denoted by (i) in Fig. 3.

Please replace the first paragraph beginning on page 18, with the following rewritten paragraph:

The voice telephone 8, upon receiving the ringer ON signal, notifies the user of arrival of the call by sounding BEEP. When the user of the voice telephone 8 unhooks a receiver, the voice telephone 8 notifies the TLA 40 via ~~an~~ a going-up control channel of the voice interface 8a that the receiver is off the hook.

Please replace the fifth paragraph beginning on page 18, and continuing on page 19 with the following rewritten paragraph:

The TLA according to the second embodiment of the invention as described above, whereby even when the power supply source of a PC on the receiving end of the call request is turned OFF, a response is detected while arrival of the call request is notified to the user of a voice telephone on the call-in side by use of the control channel signals of the voice interface 8a of the voice telephone, has the same advantages as that of the TLA according to the first embodiment. Further, the TLA enables voice communication all the time as, for example, the voice telephone 8 can be called up even when the power source for the PC ~~juxtaposed~~ associated therewith is off.

Please replace the second paragraph beginning on page 21, with the following rewritten paragraph:

(1) In the voice switching system shown in Fig. 1, the NS unit 51 is connected to the NS switching unit 50; however, it may be connected instead to the LAN hubs 10, 20 ~~at~~ as an option.

Please replace the first paragraph beginning on page 22, with the following rewritten paragraph:

(5) Fig. 8 is a block diagram showing a TLA having added functions. More effective use of a TLA can be made by providing the TLA with a function of voice compression and a function of transmitting and receiving facsimiles in addition to the functions of the system according to the fourth embodiment of the invention. In Fig. 8, a fax modem unit 70 and a voice compression unit 80 are provided at an input/output end of the TLA 30, on the LAN – HUB interface side. The fax modem unit 70 is constituted so as to be able to make conversions between analog and digital data, and is capable of making transmissions and receptions with an external network of G 3 FAX via a router. The voice compression unit 80 has a function of compressing voice data at variable compression rates of, for example, max. 8 kb/s. With the voice compression unit 80 provided, transmission and reception of compressed voice data with external networks can be performed.

Please replace the second paragraph beginning on page 22, with the following rewritten paragraph:

As described in detail hereinabove, the TLA according to the first embodiment of the invention enables voice communication over a LAN without need for a PBX, or the like.

Please replace the fourth paragraph beginning on page 23, with the following rewritten paragraph:

With the method of communication according to the eighth **aspect** of the invention, the requirement for high capacity communication is met with greater ease in comparison with a PBX having limitations on the maximum capacity for accommodatable lines.

IN THE CLAIMS:

Please amend the claims as follows:

1. (Amended) A concentrator for voice telephones installed in a LAN comprising a LAN switching unit for switching and connecting a plurality of interfaces ~~incorporated~~, and a plurality of LAN hubs accomodating equipment connected to the LAN switching unit via the interfaces, respectively, and for performing data communication over the LAN, said concentrator comprising:
 - a LAN interface connected to the LAN switching unit;
 - at least one voice telephone; and
 - ~~a at least one set or plural sets of voice telephone interfaces connected to the at least one or plurality of voice telephones juxtaposed with the equipment,~~ wherein digital or analog voice data transmitted and received by the at least one set or plural sets of the telephone interfaces are converted into MAC frames or IP packets of a fixed length, and

~~only the digital or analog voice data converted into the MAC frames or IP packets are relayed to the LAN interface side.~~

2. (Amended) A concentrator for voice telephones according to Claim 1, ~~wherein further comprising:~~

a CPU; and

~~a second LAN interface for performing transmission and reception of data between a the CPU incorporated therein and one of the LAN hubs is provided in addition to the LAN interface connected to the LAN switching unit.~~

3. (Amended) A concentrator for voice telephone according to Claim 1, ~~comprising a function of converting wherein signals from circuits of analog telephone networks subscribers are converted into call control protocols according to TCP – IP so as to be able to accommodate the analog telephone subscribers' terminals.~~

4. (Amended) A concentrator for voice telephone according to Claim 1, further comprising:

a CPU; and

~~-a second LAN interface for performing transmission and reception of data with a the CPU incorporated therein, apart from the LAN interface connected to the LAN switching unit, having a function of converting and wherein the digital or analog voice~~

data received from the ~~plurality of~~ at least one voice telephones ~~accommodated therein~~ is converted into TCP – IP packets or UDP – IP packets, and ~~transmitting and receiving the~~ TCP – IP packets or UDP – IP packets are transmitted and received via the second LAN interface.

5. (Amended) A concentrator for voice telephones according to Claim 4, further comprising a router connected to the second LAN interface for connecting the second LAN interface to either the outside of the LAN or the LAN hubs ~~at option~~.

6. (Amended) A method of communication over a LAN comprising a plurality of LAN hubs ~~accommodating~~ coupled to computing equipment for performing data communication, a plurality of ~~the concentrators for~~ coupled to voice telephones ~~according to Claim 1~~, and a LAN switching unit, having a plurality of ports and for switching and connecting between the plurality of the LAN hubs, and the plurality of the concentrators for voice telephones, ~~wherein the method comprising the step of:~~
- performing call control on one or a plurality of for the voice telephones ~~incorporated in~~ coupled to each of the concentrators ~~for voice telephones is performed by a PC or work station incorporated with the computing equipment~~ in each of the LAN hubs.

Please add the following new claims:

10. A system for communicating with voice telephones over a LAN, comprising:

a LAN switch;

a plurality of LAN hubs performing data communication and coupled to the LAN switch via respective first LAN interfaces;

computing equipment coupled to the LAN hubs via respective second LAN interfaces;

a plurality of concentrators coupled to the LAN switch via respective third LAN interfaces; and

voice telephones coupled to the concentrators via respective voice interfaces that transmit and receive digital or analog voice data, wherein the concentrators are adapted to receive the digital or analog voice data from the voice interfaces and convert it into MAC frames or IP packets and to relay the converted digital or analog voice data to the third LAN interfaces.

11. The system of Claim 10, wherein the concentrators each comprise a CPU, and further comprising fourth LAN interfaces coupled between the CPUs and respective ones of the LAN hubs for transmitting and receiving data.

12. A telecommunication apparatus for voice telephones installed in a LAN including a plurality of LAN equipment, the telecommunication apparatus comprising:

at least one LAN interface coupled to the LAN equipment;

_____ a CPU;

_____ at least one voice telephone;

a set of voice telephone interfaces adapted to receive and transmit digital and analog voice data or call control data between the CPU and the at least one voice telephone, wherein the CPU is adapted to convert the digital and analog voice data or call control data into IP packets or MAC frames and transmit the IP packets or MAC frames to the at least one LAN interface.

13. The telecommunications apparatus of claim 12, further comprising a router connected to at least one LAN interface and to a LAN hub or outside of the LAN.

14. The telecommunications apparatus of claim 12, wherein the LAN equipment includes one of a LAN hub and a LAN switching unit.

15. The telecommunications apparatus of claim 12, further comprising a LANC circuit coupled to the CPU and voice telephone interface for assembling and disassembling a MAC frame.

16. The telecommunications apparatus of claim 12, wherein the call control data are converted into a call control protocol according to TCP/IP.

17. The telecommunications apparatus of claim 12, wherein the set of voice telephone interfaces are adapted to perform a BORSCHT function.

18. A telecommunication apparatus for voice telephones installed in a LAN including a plurality of LAN equipment, the telecommunication apparatus comprising:

at least one LAN interface coupled to the LAN equipment;

a CPU;

at least one voice telephone;

a set of voice telephone interfaces adapted to receive and transmit digital and analog voice data or call control data between the CPU and the at least one voice telephone, wherein the CPU is adapted to convert the digital and analog voice data or call control data into TCP/IP packets or UDP/ IP packets and transmit the packets to the at least one LAN interface.

19. The telecommunications apparatus of claim 18, further comprising a router connected to the at least one LAN interface and to a LAN hub.

20. The telecommunications apparatus of claim 18, further comprising a router connected to the at least one LAN interface and to an external network.

21. A method of communication over a LAN, comprising:

receiving and transmitting digital and analog voice data or call control data between a voice telephone interface and a voice telephone;

receiving and transmitting the digital and analog voice data or call control data between the voice telephone interface and a CPU;

converting the digital and analog voice data or call control data into IP packets or MAC frames with the CPU; and

transmitting the IP packets or MAC frames from the CPU to a LAN interface.

22. The method of claim 21, further comprising transmitting the IP packets or MAC frames from the LAN interface to a router.

23. The method of claim 22, further comprising transmitting the IP packets or MAC frames from the router to an external network.

24. The method of claim 21, further comprising transmitting the IP packets or MAC frames to a LAN hub.

25. The method of claim 21, further comprising converting the digital and analog voice data into TCP/IP packets or UDP/IP packets with the CPU.